

The study of *Scutellaria* L. sect. *Lupulinaria* A. Hamilton (*Lamiaceae*) in Karabakh

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The article examines the study of the *Scutellaria* L. sect. *Lupulinaria* A. Hamilton (*Lamiaceae*) in Karabakh and adjacent regions. The herbarium specimens of BAK as well as various virtual herbaria samples collected in 1900-2020 have been analyzed to understand the status of research related to the genus *Scutellaria*. In addition, the species of the genus *Scutellaria* occurring in Azerbaijan and neighboring countries have also been compared by using a systematic review of relevant literature. According to the floristic study of the *Scutellaria* L. sect. *Lupulinaria* A. Hamilton in Karabakh, it is concluded that they have been poorly investigated since the second half of the twentieth century. The species have not been studied recently, last 30-40 years, so their systematics is required to be investigated comprehensively. At the same time, opinions and comments are given on the study of *Scutellaria* species of the region soon after the liberation of those areas from Armenian military occupation.

Keywords: *Scutellaria*, herbarium specimens, skullcup, Karabakh, Azerbaijan

INTRODUCTION

The Karabakh region is an eastern part of the Lesser Caucasus distinguished by its climate and landscape diversity, including mainly the mountainous areas and intermountain lowlands. It is bounded on the northwest by the Murovdag Range and on the north by Incechay Range, on the northeast by the Karabakh Plain and the east by Mill Plain, on the west by the Karabakh Range, and the southwest by Lachin, Gubadli, and Zangilan administrative districts; from the south, it extends to the state border with the Iran Islamic Republic through the territories of Jabrayil, Zangilan and Füzuli administrative districts (Səlimov, 2021). According to the botanical-geographical regionalization of Azerbaijan, mainly it covers the central and southern part of the Lesser Caucasus (Fig. 1).

The study of the flora of Karabakh and Zangazur is closely related to the expeditions conducted at different times in the region to study the flora and nature of the Caucasus in general. The systematic review of relevant literature and especially the

study of herbarium specimens collected from the Karabakh and Zangazur which were kept in various Herbarium collections all over the world displays that the first botanic expeditions to the area were undertaken by A.I.Shovich (1829), later followed by R.F.Hohenacker, F.A.Bushe, G.I.Radde, Y.S.Medvedev, V.I.Lipsky, A.A.Lomakin, B.B.Hryniewiecki and others (Еленевский, 1965).

After 1917, in addition to the floristic researches in Karabakh and Zangazur areas, several geobotanical studies were carried out to study the vegetation of forests and pastures. The botanical explorations of mountain xerophytes in the southern part of the Lesser Caucasus were carried out by A.A.Grossheim, I.I.Karyagin, T.Heideman, L.I.Prilipko, etc. in 1928-1935. Scientists have studied the southern and western shores of Lake Goycha in 1928-1929, Karabakh in 1930 (especially surroundings of Shusha), the highlands of Kalbajar in 1931, as well as the Lachin Mountains (up to Minkend village), Khojavend region including the neighborhood of Mount Ziyarat in 1935 (Гейдеман, 1940).

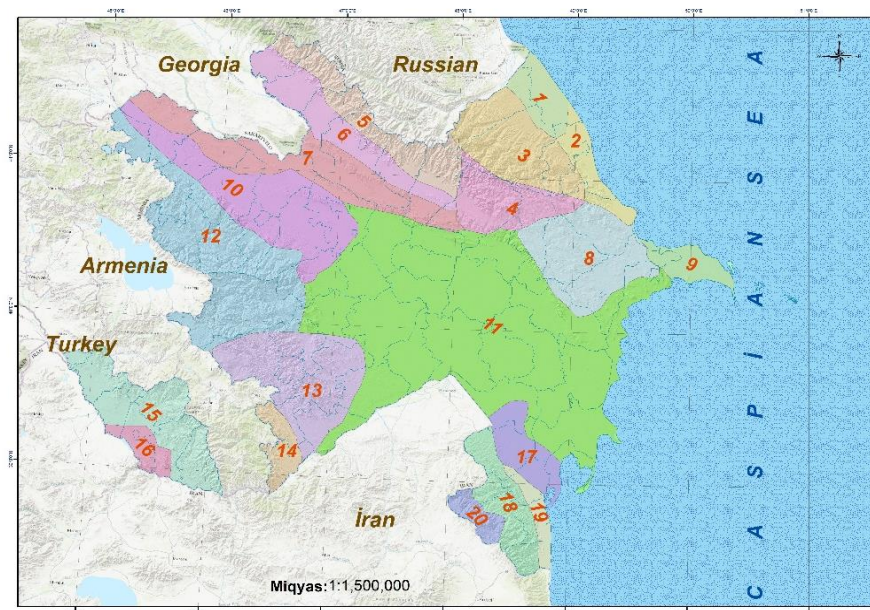


Fig. 1. Map of the botanical geographical division of Azerbaijan (after Prilipko, 1960):

- 1 - Samur-Devechi lowlands, 2 - Caspian lowlands, 3 - Quba massif in the Greater Caucasus, 4 - Eastern Greater Caucasus, 5 - Western Greater Caucasus, 6 - Alazan-Ayrichay valley, 7 - Bozgir plateau, 8 - Gobustan, 9 - Absheron, 10 - Kur plain, 11 - Kur-Araz lowlands, 12 - Northern Lesser Caucasus, 13 - Central Lesser Caucasus, 14 - Southern Lesser Caucasus, 15 - Mountain part of Nakhchivan, 16 - Nakhchivan plain, 17 - Lankaran-Mugan, 18 - Mountain part of Lankaran, 19 - Lankaran lowlands, 20 - Diabar.

Source: Salimov et al. Plant & Fungal Research 1(1): 69-85. 2018

The contribution of Acad. A.A. Grossheim's study of the flora of the Caucasus and, in particular, the flora of Azerbaijan is huge and multifaceted. One of the exceptional merits of A.A. Grossheim was the collection, herbarization, and morphological-systematic study of *Scutellaria* species found in the Caucasus area, particularly in Azerbaijan flora. He gave an overview of the *Lupulinaria* Ham. section of the genus, based on the result of many studies conducted on Caucasian representatives. In this review, only 19 species were presented, including 16 species for the Caucasus and 3 additional species for adjacent countries, Iran and Turkey. However, in 1899, V. Lipsky recorded that there were only one species for the Caucasus – *Scutellaria orientalis* L. (Гейдеман, 1940).

The majority of the herbarium specimens from the region in the second half of the 20th century were collected and studied by F. Ahmadzadeh.

As a result of the Armenian military aggression and negative impact on the biodiversity and ecosystem of Karabakh and the surrounding areas with its rich vegetation, have been severely damaged. The analysis of herbarium specimens collected from the region and a systematic review of

literature is an invaluable source for a comprehensive assessment of the damage to the flora of the zone. This research analyzes and reviews herbarium samples of BAK and various virtual herbaria on the learning and research related to *Scutellaria* collected in 1900-2020.

MATERIALS AND METHODS

Studies were carried out on herbarium materials of the *Scutellaria* L. in 2016-2021. Herbarium specimens are deposited at the herbarium of BAK, LE, and virtual herbaria of various institutions (GBIF.org, 2021) as well as other available literature (Флора Азербайджана, 1957; Флора Грузии, 1985; Флора Армении, 1980; Edmondson, 1982; Jamzad, 2002; Муртазалиев, 2009), and the results of monitoring carried out by authors in nature were analyzed. The distribution and general area of the species were based on the Flora of Azerbaijan (Флора Азербайджана, 1957).

RESULTS AND DISCUSSION

The genus *Scutellaria* L. is one of the largest genera of Lamiaceae with more than 360 species worldwide. This genus is widespread in the foothills and mountainous areas of temperate regions, where the Mediterranean and the Caucasus as well as Iran-Turanian regions and Central Asia are considered to be the main centers of the genus biodiversity (Paton, 1990).

Scutellaria is represented by 15 taxa of which 4 species (*S. prilipkoana* Grossh., *S. grossheimiana* Juz., *S. rhomboidalis* Grossh. and *S. darriensis* Grossh.) are endemic to the flora of Azerbaijan. All these 4 species were described from Azerbaijan. To understand the significance of this study, the comparison of genus *Scutellaria* with the number of taxa in Azerbaijan and adjacent flora, the number of endemic taxa, and the rate of endemism are given in Table 1. It is seen obviously, the rate of endemism in countries close to the gene center is higher than the other countries (Salimov, 2018).

Table 1. The comparison of genus *Scutellaria* L. with the number of taxa in Azerbaijan and adjacent flora, the number of endemic taxa and the rate of endemism.

Countries and Regions	The number of taxa	The number of endemic taxa	The rate of endemism (%)
Flora of Azerbaijan	15	4	27
Flora of the Dagestan	8	2	25
Flora of Georgia	13	2	15
Flora of Armenia	8	0	0
Flora of Turkey	36	15	42
Flora of Iran	27	8	30

Approximately 87% of the genus specimens in other words individuals of 13 species are represented in the herbarium Fund (BAK) of the Institute of Botany of Azerbaijan National Academy of Sciences with occurrence data. The collection also contains type samples. As a result of the revision of type specimens which are stored in the BAK, the genus *Scutellaria* (Lamiaceae) is presented by 8 authentications of four species described from Azerbaijan: *S. darriensis* Grossh. (1 types), *S. grossheimiana* Juz. (2 paratypus), *S. prilipkoana* Grossh. (1 specimen authenticum and 3 topotypes), *S. platystegia* Juz. (1 topotype).

Based on a systematic review of the literature, 4 species of *Scutellaria* L. (*S. orientalis* L., *S.*

sevanensis Sosn. ex Grossh, *S. platystegia* Juz. and *S. sedelmeyerae* Juz.) were recorded in Karabakh and surrounding areas. 21% of about 280 specimens of *Scutellaria* L. stored in the BAK were collected from these regions, especially from the administrative districts as Zangilan (15 specimens), Lachin (10 specimens) and Shusha (8 specimens). Besides, there are specimens collected from Agdam, Khojavend, Jabrayil, Fuzuli, and Kalbajar. We identified herbarium samples of *S. platystegia* Juz. predominated (43 specimens) among these collections. *S. platystegia* Juz. is widespread on foothills and it was described by S.Yuzepchuk, based on an herbarium specimen collected by Y.N.Voronov near the village of Chaytumas, Gubadli district in 1911.

Table 2. The number of herbarium specimens of *Scutellaria* L. deposited at the different herbaria.

Institution and index herbarium	<i>Scutellaria platystegia</i> Juz.	<i>Scutellaria orientalis</i> L.
Georgian Academy of Sciences, Institute of Botany, National Herbarium of Georgia	11	1
Vascular Plants Herbarium of the Komarov Botanical Institute RAS (LE)	5	1
Moscow University Herbarium (MW)	10	1
Natural History Museum, Vienna - Herbarium W	-	7
Masaryk University - Herbarium BRNU	-	3
Herbarium Berolinense, Berlin (B)	-	1
Herbarium Senckenbergianum (FR)	-	1
Total	26	15

During the research, it became clear that most of the herbarium specimens were mainly collected by A.A.Grossheim and I.I.Karyagin in the first half of the twentieth century, and in the second half by F. Ahmadzadeh. In addition, there are also collections of T.Heideman, J.Gurvich, Y.Menitsky, Y.Voronov, and I.Isayev. Herbarium specimens of *Scutellaria* species from Karabakh and surrounding areas were last collected by F. Ahmadzadeh in 1986 from Zabukh village of Lachin and in 1991 from Darzili village of Jabrayil. These collections belong to *S. platystegia* Juz. and comprises 7 and 1 specimens, respectively.

According to the collections, most of them cover the 1930s and 1940s. These areas had been under occupation as a result of Armenian military aggression for the last 30 years. Therefore, after the liberation of those areas, they are needed to be explored comprehensively to re-collect new herbarium specimens. Consequently, as a part of our ongoing research, it is planned to organize expeditions to the administrative regions of the Karabakh zone for studying the representatives of *Scutellaria* broadly.

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Qarabağda *Scutellaria* L. *Lupulinaria* A. Hamilton seksiyasının (*Lamiaceae*) öyrənilməsi

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Məqalədə *Scutellaria* L. cinsinin *Lupulinaria* Ham. seksiyasının Qarabağ və ətraf ərazilərdə öyrənilməsi araşdırılmışdır. Cinsin tədqiqinin vəziyyətini müəyyən etmək məqsədilə BAK və müxtəlif herbari fondlarında saxlanılan, 1900-2020-ci illərdə regiondan toplanmış cinsə aid herbari nüsxələrinə dair məlumatlar təhlil olunmuşdur. Ədəbiyyat materialları əsasında Azərbaycan və həmsərhəd ölkələrin floralarında rast gəlinən taksonlar müqayisəli olaraq analiz edilmişdir. Qarabağda yayılan *Scutellaria* növlərinin floristik öyrənilmə tarixinin təhlili nəticəsində müəyyən olunmuşdur ki, XX əsrin ikinci yarısından etibarən bu regionun başlıqotu növləri zəif tədqiq edilmişdir. Bu növlərin son 30-40 ilə yaxın müddətdə öyrənilməməsi səbəbindən onların sistematikasının integrativ yanaşmalarla tədqiq olunmasını tələb edir. Eyni zamanda, həmin ərazilərin erməni hərbi işğalından azad edilməsindən qısa müddət sonra regionda yayılmış *Scutellaria* növlərinin taksonomiyasına dair bir sıra sualların araşdırılmasına ilə bağlı fikir və mülahizələr verilir.

Açar sözlər: *Scutellaria*, herbari nüsxələri, başlıqotu, Qarabağ, Azərbaycan

Изучение секции *Lupulinaria* A.Hamilton рода *Scutellaria* (Lamiaceae) в Карабахе

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В статье представлены данные по изучению секции *Lupulinaria* A. Hamilton рода *Scutellaria* L. (Lamiaceae) в Карабахе и сопредельных территориях. С целью исследования статуса рода был сделан анализ сведений гербарных образцов ВАК и образцов, имеющихся в разных фондах, собранных в регионе в 1900-2020 гг. На основе литературных данных проводится сравнительный анализ таксонов, встречающихся в Азербайджане и сопредельных странах. Выявлено, что со второй половины XX века виды шлемников по данным флористического исследования *Scutellaria* в Карабахе слабо изучены. Невозможность изучения этих видов за последние 30-40 лет требует интегративного подхода к исследованию их систематики. Кроме того, представлены некоторые идеи и рассуждения по выявлению вопросов таксономии видов *Scutellaria*, которые распространились в регионе, вскоре после освобождения этих территорий от армянской военной оккупации.

Ключевые слова: *Scutellaria*, гербарные образцы, шлемник, Карабах, Азербайджан